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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/214,708	01/11/1999	MITSUSHI ITANO	XI/P6217USO	8306

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EXAMINER

PERRIN, JOSEPH L

ART UNIT PAPER NUMBER

1746

DATE MAILED: 08/31/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/214,708

Applicant(s)

ITANO, MITSUSHI

Examiner

Joseph L. Perrin, Ph.D.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-22 is/are pending in the application.
- 4a) Of the above claim(s) 11-14, 16, 17, 21 and 22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15 and 18-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Group II, claims 15-18 in the reply filed on 29 April 2004 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
2. It is noted that an Election of Species was issued on 12 September 2000, from which applicant elected the species "C₃F₆" (CF₃CF=CF₂) in the Response filed 12 October 2000. Accordingly, claims 16-17 are withdrawn from consideration as being directed to a non-elected species as set forth in the Election/Restriction of 12 September 2000. It is further noted that upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).
3. Newly submitted claims 21-22 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: Newly submitted claims 21-22 are directed to the non-elected invention of Group I, claims 11-14 for reasons of same as recited in the Restriction Requirement of 03 March 2004.
4. Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 21-22 are withdrawn from consideration

as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Specification

5. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

6. The following title is suggested:

Method of Chamber Cleaning with Fluorocarbon Cleaning Gas

Claim Rejections - 35 USC § 103

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

8. Claims 15, 18, 19 & 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,281,302 to Gabric *et al.* (hereinafter "Gabric", previously cited) in view of US 5,445,712 to Yanagida or JP 04-346428 to Sony Corp. (previously cited).

Gabric discloses a chamber cleaning method by treating a plasma CVD chamber of a semiconductor integrated circuit production device under chamber cleaning conditions using a plasma formed by the gas mixture of at least one fluorinated carbon, such as CF₄ and C₂F₆, and oxygen (O₂) (column 2, lines 3-5 & 27-44), thereby removing byproducts such as silicon and oxides and nitrides of silicon (column 1, lines 8-11; column 1, line 59 – column 2, line 2; column 2, lines 29-33; column 3, lines 5-7).

Although Gabric does broadly disclose the use of "at least one fluorocarbon" (column 3, lines 9-11), the need for increasing the amount of reactive fluorine to increase the etching rate (column 3, lines 15-19) and the advantages of a high etching rate, *i.e.* "the cleaning times are short while also being gentle on the materials" (column 3, lines 25-27), Gabric does not expressly disclose $C_3CF=CF_2$ (C_3F_6) as the fluorinated carbon cleaning gas.

Yanagida teaches that it is known in the semiconductor art to substitute an unsaturated fluorocarbon, such as hexafluoropropene (C_3F_6), for the well-known etching fluorocarbon gases, for instance C_2F_6 , in the removal of silicon oxides due to the higher etch rate of C_3F_6 and reduced amount of etching gas required as a result of the dissociation of the unsaturated bond to form two or more units of CF_x from one molecule of the etching gas (column 2, lines 1-4 & lines 40-55), and specifically for superior characteristics such as "high etchrate, high selectivity, low damage, and particularly low pollution" (column 3, lines 20-24).

Sony Corp. also teaches that it is known in the dry etching semiconductor art that unsaturated gases with the basic formula of C_xF_y , where $x=2$ or more, and $y=2x$ or less, (and preferably $CF_3CF=CF_2$), due to the higher etching rate by dissociation of the unsaturated bond (column 7, line 46 and the abstract).

Therefore, the position is taken that a person of ordinary skill in the art at the time the invention was made would have been motivated to modify the cleaning method of Gabric by substituting a saturated fluorocarbon gas with the unsaturated fluorocarbon gas (namely, $CF_3CF=CF_2$) disclosed by either

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Yanagida or Sony Corp., in order to provide more efficient cleaning by plasma etching as well as other known characteristics such as lower pollution.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph L. Perrin, Ph.D. whose telephone number is (571)272-1305. The examiner can normally be reached on M-F 7:00-4:30, except alternate Fridays.

10. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael E. Barr can be reached on (571)272-1414. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

11. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Joseph L. Perrin, Ph.D.
Examiner
Art Unit 1746



jlP